Efficiency of Abound FL Application over Time in a Peanut Field

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Fungicide studies conducted from 2009 – 2011 to manage pod rot caused by *Pythium* and *Rhizoctonia*, were aimed at comparing early, calendar-based fungicide applications versus threshold based applications. The early, calendar-based applications had reduced pod rot compared with threshold based systems. However, it was possible that the earliness of the application was the reason for better disease control, since the first application was made before many pods were present. The objective of the test conducted in 2012 was to examine the effect of application timing (earliness) on disease control and on chemical residue present on foliage, soil, and pods. To accomplish this, each treatment occurred at a different week of the season, with the first application made on 9 July and the last application made on 17 August. There were six treatments with a single application made at a different time during the summer, a nontreated check, and a well-treated check where two applications were made (19 July and 17 August). Plots were intensively sampled weekly to rate for pod rot, starting on 16 July and continuing until the end of August. Samples were sent for chemical (azoxystrobin) concentration analysis of certain treatments on 17 and 31 July and 15 August. Plots (1,000 ft. long and 4 rows wide) were thrashed with a 4-row machine and harvest weight was taken via load cells under a peanut trailer. Three small samples were taken from each harvested plot to grade.

Chemical analysis. The producer made an infurrow, at-plant application with Abound FL. There was still Abound FL present in the soil at the first sampling date (17 July, Fig. 1).

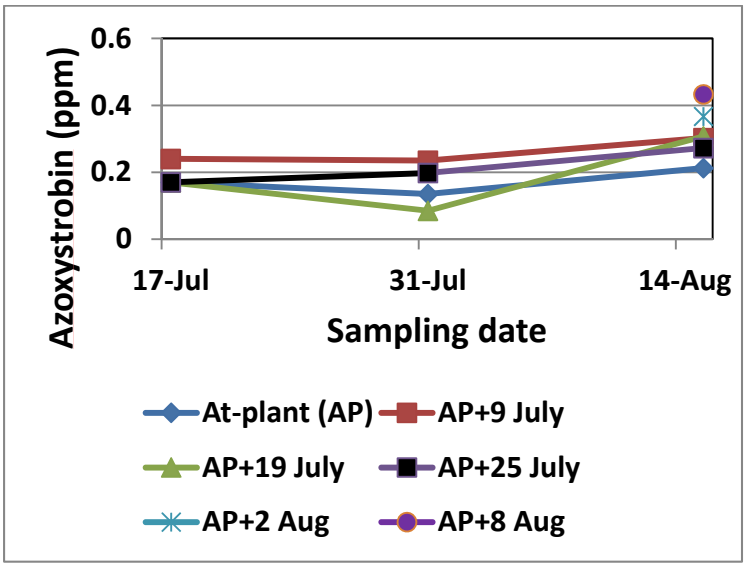

Figure 1. Concentration of fungicide in soil at three sampling times and six application times.

The fungicide was at similar concentrations in the soil throughout the sampling time and between all treatments, regardless of application time (Fig. 1). This indicates that some concentration of the fungicide remained from the at-plant application in the soil, and that subsequent applications during the growing season were not successful at increasing the concentration in the soil. The fungicide applications need to reach the soil to be able to control pod rot successfully. The only application that reached the soil was the one applied to the soil at planting.

Most of the fungicide remained on the plant foliage with the in-season applications (Fig. 2, Table 1). Unfortunately, Fig.2 clearly shows that an application was made over the entire test area between 31 July and 14 August, presumable by the producer. The nontreated check (◆) had a large increase in concentration (from 0 to 1.9 ppm) between the last two sampling times. A similar response was seen with the 9 July application (■) when the concentration was appropriately high at the first sampling date (17 July), and then dropped at the second sampling date (31 July), but inexplicably increased dramatically on the third sampling date. This only could have occurred if another application was made to those plots. Similarly, the concentration of azoxystrobin for applications made on 19 July and 25 July did not drop between the 31 July and 14 August sampling dates, as would have been expected. So, the objectives of the experiment will be more difficult to answer given the overtreatment that occurred in August.

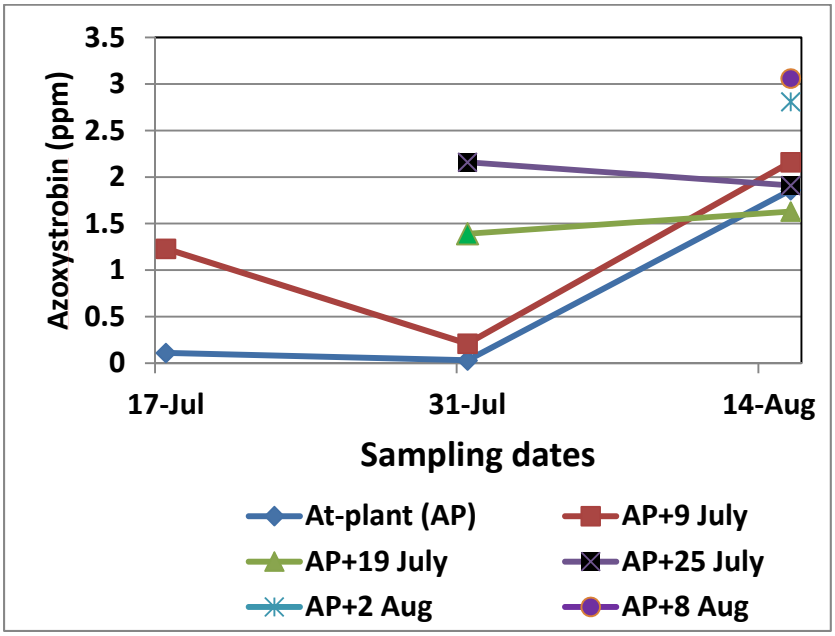

Figure 2. Concentration of fungicide on foliage at three sampling times and six application times.

Table 1. Percentage and concentration of azoxystrobin found on the foliage versus the pods.

Parameter	Sampling date	Fungicide application date					
		None	9 July	19 July	25 July	2 Aug.	8 Aug.
Foliage (F) ppm	17 July	0.1050	1.2325				
Pods (P) ppm	17 July	0.0125	0.1175				
% F/(F+P)	17 July	89.4%	91.3%				
Foliage ppm	31 July	0.0250	0.2075	1.3925	2.1600		
Pods ppm	31 July	0.0325	0.0386	0.0325	0.0375		
% F/(F+P)[a]	31 July	43.5%	84.3%	97.7%	98.3%		
% (F+P)[a]/(F+P)[b]	31 July	2.6%	11.2%	64.8%	100%		
Foliage ppm	15 Aug.	1.8600	2.1550	1.6250	1.9100	3.655	5.09
Pods ppm	15 Aug.	0.0650	0.0725	0.0925	0.1375	0.1025	0.1025
% F/(F+P)[a]	15 Aug.	96.6%	96.7%	94.6%	93.3%	97.3%	98.0%
% (F+P)[a]/(F+P)[b]	15 Aug.	37.1%	42.9%	33.1%	39.4%	72.4%	100%

[a]The foliage and pod concentrations were of the same application date.
[b]The foliage and pod concentrations were from the most recent application date to the sampling date (9 July on the 17 July sampling date; 25 July on the 31 July sampling date; 8 Aug., on the 15 Aug. sampling date).

The concentration of Abound FL in the soil remained constant for all the treatments and throughout all the sampling dates (or at least not significantly different), therefore it will be assumed that there was little contribution to the soil concentration by the fungicide applications made after planting. To examine how much of the application was staying on the foliage and how much was making its way to the pods, the concentration on the foliage was divided by the concentration on the foliage and pods, at the most recent application time to the sampling date. So, for the July 17 sampling date, there was 91% of the product on the foliage at 6 days after application. On the July 31 sampling date, there was 98.3% of the product on the foliage at 6 days after application. On the 15 August sampling date, there was 98% of the product on the foliage at 7 days after application. It appears that almost no product was making its way to the soil to protect the pods against *Rhizoctonia* and *Pythium* pod rot. The application of fungicide was made at 20 gal/acre and 30 psi.

In terms of how fast the fungicide was degrading on the foliage and pods, the July 31 sampling date provides the best information. There was a strong linear decline in fungicide concentration on the foliage over time (Fig. 3). The model predicted that immediately after application, the initial concentration was 2.88 ppm, and that the fungicide declined at a rate of 0.1217 ppm/day, or at a rate of 4.2%/day. There was very little fungicide left on the leaves by 3 weeks after application. It is not known if this decline would be typical with other strobilurin type fungicides meant to provide leaf spot protection. The situation on the pods was completely different, and there was no decline in concentration over time (Table 1), but there was also a very low concentration on the pods, probably below that necessary to give disease control.

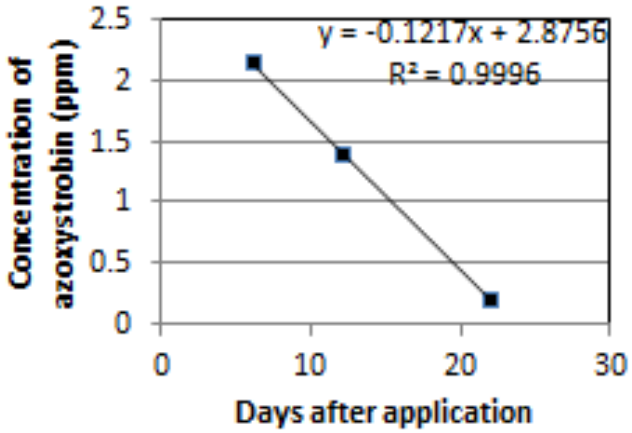

Fig. 3. Concentration of azoxystrobin on the foliage over time after fungicide applications.

Pod Rot over Time. Intensive sampling began on 11 July and terminated on 29 August, which was when the overtreatment with fungicide across the entire test area was discovered. There was no differences between treatments and pod rot at each sampling date, so they will be averaged to present the general dynamics of pod rot in this field during the sampling time (Fig. 4).

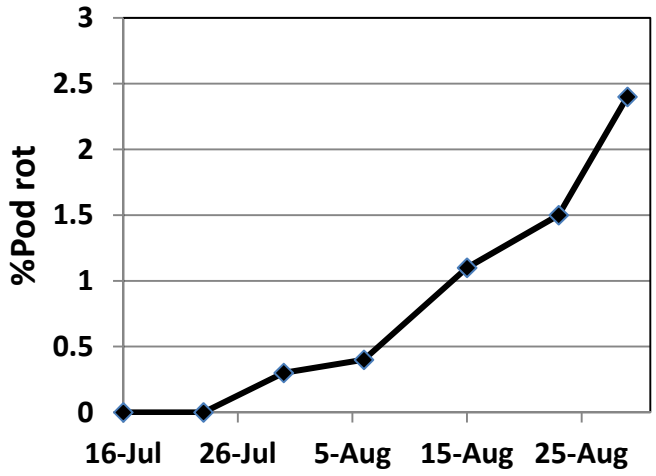

Figure 4. Pod rot over time in 2012.

In previous years, pod rot measurements over a number of weeks were analyzed to determine treatment differences, however, in 2012, there were only 1 or 2 measurements that were made when pod rot was present, and before the over-treatment occurred. So, even if the potential was there for treatment differences, there was not enough time to measure it definitely before the overtreatment was made. The primary fungus causing pod rot in 2012 was *Pythium* (Fig. 5), which is interesting because the dominant fungus in the other half of this circle in 2011 was *Rhizoctonia*.

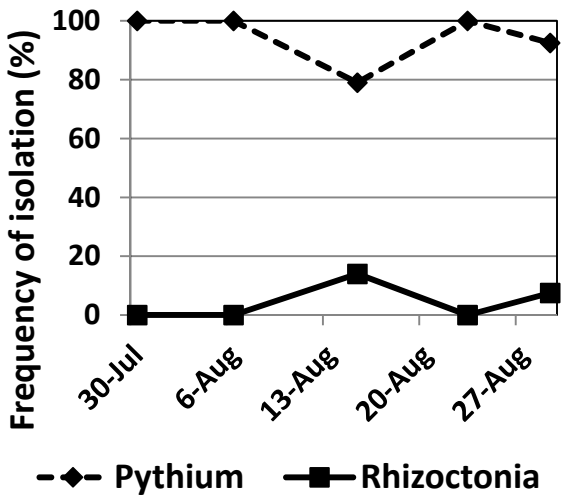

Figure 5. Frequency of *Pythium* and *Rhizoctonia* isolated from rotted pods in 2012.

Harvest. There were no treatment differences with respect to any of the measured parameters, including yield, grade, % damaged kernels, value ($)/acre (Table 2).

Table 2. Selected measurements taken from harvest in 2012.

Application Time	Yield (lbs/acre)	Value ($)/acre	Grade	% Damaged Kernels
None	5,779	1,008	71.1	0.5
July 9	5,514	969	71.3	0.8
July 19	5,513	969	70.8	0.6
July 25	5,600	991	71.6	0.4
Aug. 2	5,613	987	71.3	0.5
Aug. 8	5,573	979	71.9	0.6
Aug. 15	5,550	955	69.7	1.2
July 19 + Aug. 15	5,699	994	70.7	0.8

Conclusion

We did not achieve our original objective which was to determine if early applications of Abound FL would result in better pod rot control than later applications. However, we did determine that very little fungicide from all applications made it to the pods, so there was very little pod rot protection. The best way to improve pod rot control will require better applications, before we can determine the best time of the summer to make applications. The application volume of 20 gal/acre and 30 psi was not sufficient in 2012, which was a year when plants grew rapidly so foliage was thick, to allow fungicide to reach the soil. Future work should probably look at night time or early morning applications when foliage is positioned better to allow fungicide to reach the ground, and in increased water volume and pressure.